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(54) **Peanut spread**

(57) A peanut spread comprises an essentially homogeneous dispersion of finely divided peanut meat in a continuous oil phase, and has an oil content of from about 20 to 35% by total weight, and an oil-to-peanut protein ratio of from about 1:2 to 4:3 by weight.

The spread is produced by low-medium shear agitation of ground roasted peanuts and roasted defatted peanut meat. The spread simulates the organoleptic and textural characteristics of peanut butter, while exhibiting a significant reduction from conventional oil and caloric contents. Other additives may be present, including non-peanut protein sources and vegetable oils, and fibre.

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SPECIFICATION

Peanut spr ad and process for producti n

Peanut butter enjoys wide acceptance and appeal as a food f r both children and adults. This is due largely to the compatability of its taste and consistency with numbers of other foods.

A conventional peanut butter is prepared from shelled peanuts roasted at about 170°C which are thereafter cooled to about 30°C. These roasted peanuts are then blanched (i.e. the skins and nibs are removed) and the blanched kernels are split into halves. The blanched split peanuts are then coarsely ground and to these coarsely ground nuts are added optional ingredients, such as: sweetener, salt and hydrogenated vegetable oil. All of the ingredients are thoroughly mixed and are finely ground. This mixture is then cooled and packed in jars.

Colour and taste are largely a function of peanut roasting and seasoning addition. The consistency recognised as characteristic of conventional peanut butter spreads, however, derives chiefly from the grinding step. During grinding, the granular peanut meat is transformed into a semi-liquid (visco-plastic) state. This occurs largely as a result of particulation of the peanut meat with concurrent rupture of its oil (or fat) cells. Sufficient oil is generally released (although, in some instances, supplementary amounts may be added) to form a continuous oil phase which will disperse the finely ground meat particles.

One of the basic drawbacks of oily dispersions such as peanut butters lies in their nutritional-dietetic quality. A chemical analysis of a typical product will show an oil content of 51.5%, a protein content of 29%, and a fibre content of 1–2%. Sugars, carbohydrates and moisture normally constitute the rest of the product. The appeal of peanut butter as a protein source is thus counterbalanced by its high caloric value.

Means for improving the overall nutritional-dietetic quality of peanut butters have, of course, been sought in the past. In large measure, however, these attempts have involved dilution of the spreads with supplementary (normally proteinaceous) fillers. Representative of such attempts are U.S. Patent 3,216,830, directed primarily to inclusion of animal proteins such as milk solids or albumin powders, and U.S. Patent 3,580,729, of soy flour.

Various prior art attempts to improve peanut butters have been partially successful, particularly in improving their nutritional balance of amino acids and vitamins. However, they have failed appreciatively to affect the caloric and oil drawbacks noted above and have often introduced unacceptable changes of taste and consistency.

The present invention relates to a peanut spread having a significantly lowered caloric value as compared to commonly accepted or commercial peanut butters. This spread also evidences an enhanced protein composition and a decrease in oil content.

Notwithstanding these alterations in chemical composition, however, the peanut spreads of this invention approach the organoleptic, consistency and appearance qualities which have come to be expected of peanut butters. Further, they may (and preferably are) composed of at least 75%, most desirably between 80% and 98%, naturally-occurring or processed peanut constituents.

In accordance with the present invention, a peanut butter-like spread is prepared from an admixture comprising a combination of native and defatted peanut meats which have been ground and roasted. With these two forms of peanut meat (and such optional additives as are conventional or—as described below—have been discovered further to improve the resultant product), a novel and highly desirable peanut spread is readily obtained.

Defatted peanut meat may be obtained in a variety of ways. Most conveniently, however, granules or grits may be defatted by a conventional prepress solvent extraction process such as that described by J. L. Ayers *et al.* in the *Journal of American Oil Chemists Society, 51*:133 (1974). After defatting to the desired degree—ordinarily from its native content of about 50% to less than 15%, preferably less than about 2% by weight—the meat is roasted to develop its characteristic "nutty" flavour. This may, for example, be accomplished in a fluidized bed dryer in from 1 to 10 minutes, preferably about 2 minutes at from 150°C to 300°C, preferably about 250°C. The roasted, defatted meat is then ground.

The defatted roast peanut meat may be ground separately from, or with, conventional native roasted peanuts. Ultimately, however, a relatively uniform and comminuted admixture of, for example, up to about equal weights, preferably between 30 and 90%, defatted meat by weight of non-defatted peanuts, is prepared.

Once the admixture of native and defatted, roast ground peanut meats has been formed, it is converted into the essentially homogeneous dispersion of finely divided meat in a continuous oil phase which is characteristic of a peanut butter. This conversion is accomplished by subjecting the admixture to mechanical agitation under low-medium shear.

Dependent upon the temperature and shear during agitation, the admixture undergo s a dramatic change in composition (readily measured in terms of change in viscosity with time) to the desired oily dispersion. This is true even though the admixture has less oil (dependent upon

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the proportion of defatted peanut meat present) than has ordinarily been considered necessary for a spread. Although subject to wide variation, shear rates of between 1 to 100 per second and temperatures of 25° to 80°C hav proven successful. Under these conditions, the viscosities of the initial admixture drop exponentially from a range of from about 500 to 1,000 poise to from about 1 to 100 poise in less than 1 hour, preferably between 15 to 30 minutes.

In a preferred embodiment, the progress of mechanically induced conversion of the admixture to spread form is carefully monitored. This is done to ensure appropriate texture or mouthfeel in the product. Agitation is ceased when the spread has reached a viscosity of between 1 and 50, most desirably about 5 to 30, poise at 40°C. Such a value closely approximates the composition of commercial peanut butters and may be assured through periodic samplings of the admixture-spread during agitation.

After the spread has been agitated to the desired degree, it may be degassed to eliminate trapped air and cooled to ambient temperature (if necessary). It is then in condition to be packaged, ordinarily under nitrogen atmosphere, in conventional manner.

The product spreads of this invention are closely similar in taste, texture and appearance to other prior art peanut butters. By virtue of the inclusion of defatted peanut meat as a starting material, however, they differ substantially in composition and nutrient-dietetic value. Instead of about 50%, these spreads contain only about 20 to 35% oil by weight. This reduction is of considerable importance. It represents a means for reducing the total amount of high caloric oil in peanut oils. Moreover, it permits depressions of the oil-to-peanut protein ratio to a level of between 1:2 to 4:3, preferably 1:2 to 1:1, so as to provide a relative increase in desirable protein content in a peanut spread.

Although the process and product of this invention have been described primarily in terms of their peanut meat constituents alone, other conventional components of peanut butters may be included in the present spreads. Suitable amounts of these components by total weight include, for example:

NaCl	– up to 2%, preferably 1 to 1.5%
Vegetable Oil	– up to 10%, preferably up to 5%
Sweeteners	– up to 8%
dextrose	– up to 4%, preferably 1 to 3%
sucrose	– up to 6%, preferably 3 to 5%
Stabilizers	– in amounts reduced in proportion to the reduced oil content of the spread.

Of these conventional components, the salt and sweeteners are of major importance to taste. Oil is utilized to modify consistency, generally through incorporation of high or lower melting point oil to adjust the spread texture provided by native peanut oils. This function of oils may be used in a greater degree in accordance with the present invention. Admixtures very high in defatted meats may be freely adjusted upwards in oil content to obtain optimum consistencies.

In addition to such conventional components, certain additives have been discovered to be particularly compatible with, and/or co-operative in, the present spreads. Illustrative of these components are solid bulking agents and nutritive materials. These may include, for example, non-peanut or auxillary (preferably fat-free) protein sources such as roast chick peas, triticale, soy, Casein and non-fat dry milk solids and or/fibre sources such as peanut skins or cellulose. These agents benefit the present spreads by increasing protein content, decreasing caloric value and/or improving protein quality. They may be incorporated in a total amount of less than about 30%, preferably 5 to 15%, by total weight.

The present spreads also benefit from incorporation of surfactant into the spread. Surfactant facilitaties substitution for native peanut meat, permitting up to about 50% by peanut weight of total optional components In addition, surfactants give increased control over the viscosities of these products. Exemplary surfactants include the polysorbates, glycerol-stearates, glycerides and combinations thereof. They are normally incorporated in amounts up to about 3%, desirably 1–2%, by weight.

Where any of the foregoing optional ingredients is to be present in these peanut spreads, incorporation may most conveniently be performed by addition to the admixture of defatted and native peanut meats. This permits homogeneous dispersion during mechanical agitation.

Th examples which follow provide a more detailed description of the present inventi n and of its best mode. These examples ar , howev r, merely illustrativ , and not limitative, of the scope of this invention.

EXAMPLE I

A spread having the formulation:

Ground roasted peanuts	54.52%
Roasted, defatted peanut grits	37.0%
Sweetener:	
Sucrose	4.2%
Dextrose	2.0%
Surfactants:	
Glycerol lacto palmitate	0.63%
Mono and di-glycerides	1.2%
NaCl	1.2%

was prepared under constant mixing at 60°C by combining the ground-roasted peanuts and surfactants, followed by the sweetener and salt, and then finally the grits. This was done to ensure uniform distribution. The entire admixture was then passed through a roller mill to a mechanical agitator. In the agitator, the admixture was subjected to a shear rate of 2.95 per second at 45°C. After one minute, it exhibited a viscosity of 670 poise. Agitation was continued at this rate for 30 minutes until a viscosity of 18.4 poise was reached.

The spread was then degassed, cooled to 25°C and packed in jars under nitrogen gas. Analysis of the spread showed the following:

Component	Conventional peanut butter (% by weight)	The present peanut spread (% by weight)
Oil	51.5	28.96
Protein*	28.5	42.6
Ash	4.9	4.62
Fibres	1.7	4.2
Water	1.6	1.0
Carbohydrates (by difference)	11.8	18.62

* Computed using a factor of 6.25 × N

The caloric content of this peanut spread was analysed to be about 22% lower than that of the conventional peanut butter. Chicken feeding studies showed a 23% lower caloric value for the present spread.

Sensory evaluations carried out using a selected panel gave the following scores for the product in comparison to the regular peanut butter on a 1 to 7 subjective scale (1 = poor, 7 = excellent):

Sample	Appearance Mean	Texture Mean	Flavour Mean
Regular Peanut Butter	6.77 (0.44)*	6.55 (0.52)	6.1 (1.26)
Low Calorie Peanut Spread	6.00 (0.70)	5.77 (0.83)	5.55 (1.42)

*Numbers in parenthesis give the standard error of the estimates of the mean scores

A panel composed of 50 females selected to evaluate the spread gave the following ratings on the indicated attributes:

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Attribute	Number of Panelists Rating the Spread			
	Excellent	Good	Fair	Poor
Real peanut taste	22	17	7	4
Texture/consistency	6	15	13	16
Spreadability	13	20	14	3
Colour	25	22	2	1

Out of the same group of panelists, 60 to 70% rated it to have just right peanut flavour, just right salt content, and just right consistency. The spread product was, however, perceived to be "slightly grainy" in comparison to regular peanut butter.

EXAMPLE II

Using the procedure of Example I, a spread was prepared having the following formulation:

Ingredient	% by weight
Ground roasted peanuts	50.42
Roasted, defatted peanut grits	40.0
Peanut skins	0.5
Dry sorbitol	1.5
Sucrose	0.5
Dextrose	1.5
Salt	1.25
Microcrystalline cellulose (Avicel)	3.4
Glycerol lacto palmitate	0.63
Mono-di-glyceride	0.30

The above formulation gave a caloric reduction of about 24% over regular peanut butter. The protein and fibre content of the above product were found to be 44 and 7.6%, respectively. These protein and fibre contents compare favourably with about 28.5 and 1.7%, respectively, for the regular peanut butter.

EXAMPLE III

Using the procedure of Example I, a spread was prepared having the following formulation:

Ingredient	% by weight
Ground roasted peanuts	54.17
Roasted, defatted peanut grits	32.0
Sucrose	4.0
Dextrose	2.0
Salt	1.2
Microcrystalline cellulose	5.0
Mono and di glycerides	0.65
Glycerol lacto palmitate	0.63
Hydrogenated vegetable oil	0.35

The caloric value of this spread was about 21.5% lower, and the protein content about 33% higher, than peanut butter.

EXAMPLE IV

Using the procedure of Example I, a spread was prepared having the following formulation:

Ingredient	% by weight
Ground roast d peanuts	51.02
Roasted, defatted peanut grits	32.0
Non-fat dry milk solids	5.0
Peanut skins	0.5
Sucrose	4.0
Dextrose	2.0
Salt	1.2
Microcrystalline cellulose (Avicel)	3.0
Glycerol lacto palmitate	0.63
Mono-di-glyceride	0.30
Hydrogenated Vegetable Oil (palm-Peanut) Stabilizer	0.35

The above formulation gave a caloric reduction of about 23% over regular peanut butter. The protein and fibre content of the above product were found to be 40 and 5.8%, respectively. These protein and fibre contents compare favourably with about 28.5 and 1.7%, respectively, for the regular peanut butter.

CLAIMS

1. A peanut spread comprising an essentially homogeneous dispersion of finely divided peanut meat in a continuous oil phase, said spread having an oil content of from about 20 to 35% by total weight, and an oil-to-peanut protein ratio of from about 1:2 to 4:3 by weight.

2. A spread as claimed in claim 1 wherein the protein content is at least about 35% by total weight.

3. A spread as claimed in either claim 1 or claim 2 wherein the content of peanut protein is at least about 35% by total weight.

4. A spread as claimed in any one of claims 1 to 3 wherein the oil-to-peanut protein ratio is less than 1:1 by weight.

5. A spread as claimed in any one of claims 1 to 4 wherein the spread viscosity at 40°C is between 1 to 50 poise.

6. A spread as claimed in any one of claims 1 to 5 wherein the dispersion additionally contains up to about 15% by weight of non-peanut auxillary protein.

7. A spread as claimed in any one of claims 1 to 6 wherein the dispersion additionally contains up to about 3% by weight of surfactant.

8. A spread as claimed in any one of claims 1 to 7 wherein the dispersion additionally contains up to about 10% by weight of fiber.

9. A spread as claimed in claim 1 and substantially as hereinbefore described.

10. A process for producing a peanut spread as claimed in claim 1 which process comprises subjecting an admixture comprising ground roasted peanut meat and up to about an equal weight of defatted ground roasted peanut meat to mechanical agitation at a shear rate of from 1 to 100 per second and a temperature of from 25 to 80°C for a period of time sufficient to convert said mixture into said spread.

11. A process as claimed in claim 10, wherein said spread has a viscosity at 40°C of from 1 to 50 poise.

12. A process as claimed in claim 10 and substantially as hereinbefore described.

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